



John F. Kennedy Space Center's Broadband Light Spectrometer Calibrator



The National Aeronautics and Space Administration (NASA) seeks partners interested in the commercial application of the Broadband Light Spectrometer Calibrator. The Broadband Light Spectrometer Calibrator is a new approach to calibrate a miniature charge-coupled device (CCD) spectrometer more accurately than current factory calibrations. Typically the factory calibration is done with a spectral line source that generates light at known wavelengths, allowing specific pixels in the CCD array to be assigned wavelength values. This method is accurate to about 1 nanometer (nm) across the spectrometer's wavelength range. This new method is approximately 50 to 100 times as accurate as factory calibration.

During the development of a wide-dynamic-range displacement sensor, using white light and a miniature spectrometer factory-calibrated spectrometers produced measurement errors. In order to complete the development of the displacement sensor, the Broadband Light Spectrometer Calibrator was devised to calibrate the sensor.

- Calibrates to approximately ± 0.01 nm.
- Calibrates 50 to 100 times as accurate as current factory calibration methods.
- Calibrates every pixel across a given wavelength range versus the current approach of only calibrating a few pixels and then interpolating the other values.

opportunity

APPLICATIONS

- Highly precise motion detection
- Physics (atomic force microscopes)
- Highly accurate short-distance measurement sensors
- Manufacturing (inline process/quality control)
- Chemistry (compound analysis, etc.)

TECHNOLOGY STATUS

- ☒ Patent pending
- ☐ U.S. patent
- ☐ Copyrighted
- ☒ Available to license
- ☐ Available for no-cost transfer
- ☒ Seeking industry partner for further codevelopment

Technology Details

This technology provides highly accurate calibration of the wavelength assignment for spectrometers and is particularly useful when more accuracy is required than can be provided by factory calibration.

Compared to current factory calibration techniques, which are accurate to approximately ± 1.0 nm, this new technology is accurate to approximately ± 0.01 nm.

Spectrometers use the dispersion of light waves to assess properties of materials, including chemical composition, density, distance, or movement. The light waves can be visible or invisible (infrared, ultraviolet, radio, or microwave).

This innovation uses broadband (white) light and a Michelson interferometer to produce an optical signal, which is sent into the spectrometer. The spectrometer output is then compared with a predicted pattern, allowing accurate calibration of the spectrometer.

This technology applies primarily to miniature CCD spectrometers but may also be useful for larger spectrometers.

Partnership Opportunities

All NASA licenses are individually negotiated with the prospective licensee, and each license contains terms concerning commercialization (practical application), license duration, royalties, and periodic reporting. NASA patent licenses may be exclusive, partially exclusive, or nonexclusive. If your company is interested in the new Broadband Light Spectrometer Calibrator technology, or if you desire additional information, please reference Case Number KSC-13331 and contact:

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